# Scientists and Ethical Dilemmas

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***Ethical dilemmas will have to be subjectively handled. Each scientist and each technologist will have to look deep into his own 'soul' and try to find the answer for himself.***

The complex and conjugate interrelations and entanglements between science and ethics may be best illustrated by taking some special and concrete cases as well as by pondering on fundamental generalities. Let us begin by considering three famous examples involving three famous personages, namely Alfred Nobel, Albert Einstein and Julius Robert Oppenheimer.

## Alfred Nobel and Dynamite

The story of dynamite makes interesting reading. Alfred Nobel (1833-1896), a young Swedish chemist, was experimenting with the explosive compound nitroglycerine. Nitroglycerine (NG) is a liquid, which is dangerous to be carried from place to place, since the slightest shock or concussion could set it off to a powerful explosion. Nobel found out, by accident, that when the liquid NG was absorbed in "kiesulghur" (an earthy powder), the resulting solid mass with absorbed NG could be safely transported. This absorption in kiesulghur did not affect the power of the explosive. Nobel named this mixture "dynamite' in view of its dynamic explosivity. Dynamite soon found use in warfare and it was used in the Crimean war (1853-1856). Dynamite was also used for peaceful purposes like blasting rocks and thus helping to make roads, railways, tunnels, etc. Later he developed other explosives like blasting gelatin and ballistite. Soon, Nobel found that he had become a millionaire!

Then, in 1888, a French newspaper inadvertently published a premature obituary notice of Nobel. The obituary note, while condoling Nobel's death, and describing him as an immensely rich man,

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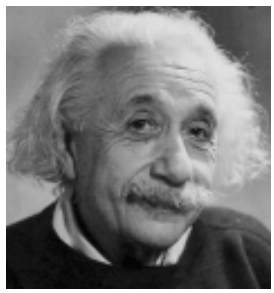
also mentioned that he was the man who invented destructive materials and made them on a large scale and was responsible for mass deaths[1]. The title of the premature obituary in French was " LE MARCHAND DE LA MORT EST MORT"-- English translation: "THE MERCHANT OF DEATH IS DEAD". While the newspaper soon corrected the misinformation (about Nobel's death), Nobel was deeply concerned by the unflattering description of himself. He started to have doubts and feelings of guilt. "Was that how posterity would see me"? --, he wondered. To correct this, he wanted to do something positive. After considerable thought, Nobel instituted the famous Nobel Prizes. Alfred Nobel earmarked the bulk of his earnings for this purpose. Today we remember Nobel as the man who established the Nobel Foundation and as the man who originated the awards of the world's most famous prizes of all time.

Here, the point is: Can we absolve Nobel of his responsibility for the destructive uses of the explosives he made and marketed? Can we condone this 'evil' in view of the 'good' that he did in instituting the world's most prestigious prizes?

## Einstein and the Atomic Bomb

It is well-known that in the evening of his life, nothing pained Einstein more than the allegation that he was the "Father of the Atomic Bomb". He resisted this allegation with all his strength. His protests were, however, feeble partly because of his worsening health and advancing age and increasing loneliness, and partly because of his growing disenchantment with science. It is a feeling of guilt that made him ruefully say that if he had a chance to live his life once again from the start, he would prefer to be a fruit merchant ("fruit peddler of four seasons") than be a scientist!



Einstein was held responsible on two counts.

The First charge is that it was his famous equation $E = mc^2$ that paved the way for man's harnessing of nuclear energy, which led to the making of the bomb. This allegation, of course, is not tenable. At the time (1905) when Einstein enunciated his Special Theory of Relativity (STR), which implied, *inter alia*, also matter-energy equivalence, he did not have the foggiest idea of its destructive potential. Einstein should in all fairness be exonerated of this charge.

The second charge is more serious. Einstein did write 4 letters (not just one, but ***four***!) to the President of the United States, urging him to ensure that America should make the atomic bomb before the *Nazis* in Germany succeeded in making the Bomb[2]. The chronology of the Four letters is as follows:

The First Letter addressed to Franklin D. Roosevelt, President, U.S.A., is dated 02 August 1939. In it, Einstein told Roosevelt that, after discussions with nuclear experts like Fermi and Szilard, he understood that the nuclear chain reaction during fission could be used to make a very destructive bomb which can destroy entire ports or cities. He also mentioned his apprehension that the Germans might be in the process of utilizing

the uranium ores which fell into their possession after their conquest of Czechoslovakia.

The second letter dated 07 March 1940 reiterated Einstein's fears. He also mentioned about the nuclear expert Wigner whom he consulted in this regard. He informed Roosevelt that in Germany, the Chemistry and Physics Institutes under the Kaiser Wilhelm Institutes ( now renamed in modern Germany as Max Planck Institutes) were progressing fast in nuclear research.

In the third letter, dated 25 April 1940, Einstein urged that nuclear research tempo in the U.S.A must be enhanced and cooperation between scientists in universities and research establishments should be enlisted. Adequate funds should be provided and an Advisory Committee must be constituted.

The last and fourth letter dated 25 March 1945, was not read by Roosevelt whose health was failing. The letter must have been read by Harry S. Truman, who succeeded Roosevelt as President. (Roosevelt died on 12 April 1945.) In this letter, Einstein wanted to introduce the bearer of the letter, Dr. Szilard, to the President. He introduced Szilard as a co-discoverer of the neutron emission taking place during nuclear fission. He expressed his deep concern in the matter and tried to impress on the President the need for immediate and urgent action.

These *four letters* went a long way towards the establishment of the Manhattan Project which ultimately led to the making of the Atomic Bombs. It is still a moot point whether history could absolve the great man of all moral responsibilities in this regard.

Of course, one could say that Einstein chose the lesser evil (of America making the Bomb first) to prevent the greater evil (of the German *Nazis* perfecting and making the Bomb before the Allies). Hitler was already bragging about the dreaded "*Geheimwaffe*" (Secret Weapon). Although with historical hindsight, we now know that by the usage of the enigmatic word "*Geheimwaffe*", Hitler was probably referring to the rockets then built by Wernher von Braun at Peenemuende in Germany. (It is the irony of history that after the War, von Braun emigrated to the U.S.A and helped the development of rocketry and space flight in his newly adopted country.) But at that time (1944-45), the spectre of Germans making the Atomic Bomb first was a real nightmare and Einstein was in a way justified to make an effort to preempt this dreadful eventuality. After all, he himself was a victim of Hitler's hunt of the Jews. One remembers the poignant passage in his memoirs, where he mentions telling his wife to have a last look at their beautiful house in Germany before they fled from *Nazi* tyranny in 1930 to the safety of the asylum in the U.S.A. He had told his wife: "Take a good look at our house; you will never see it again in your life!"

## Oppenheimer and the Atomic and Hydrogen Bombs

One of the architects of the Atomic Bomb was the physicist J. Robert Oppenheimer (1904-1967). He is credited with reciting the famous verse of the Bhagavad Gita,

*Divi surya sahasrasya*
*Bhaved yugapad utthita*
*Yadi bha sadrshi sa syad*
*Bhasas tasya mahatmanah*
("If the radiance of a thousand suns were to burst at once into the sky, that would be like the splendor of the mighty one.")

when he witnessed the test explosion of the experimental atomic bomb (on 16 July 1945) in the desert in Alamogordo in New Mexico. Later, the two bombs were dropped in Japan(Hiroshima on 6 August 1945 and Nagasaki on 9 August 1945). The resultant colossal loss of life and desolation touched Oppenheimer deeply and he refused to collaborate in the making of the Hydrogen Bomb. For this non-cooperation, he was harassed by the authorities and virtually placed under house arrest.

A reporter once asked him - Why he did help in the making of the Atomic Bomb in the first instance, although later he refused to help in the making of the Hydrogen Bomb? Oppenheimer's answer is famous among scientists. He said "Anything technically sweet is irresistible to a physicist!"

What Oppenheimer meant was: Science is an insatiable and never-ending quest for truth. The desire to know, to understand things, to invent, to discover - is the uppermost passion of a scientist. In this mad search for unraveling nature's facts and potential, he sometimes forgets ethics and values! And when he finds out something, his urge to communicate it to the entire world is also irresistible!

## The dilemma of the "value-neutrality" of science

Concerning the conflict between Science & Technology (S&T) and Ethics, many scientists say that science is amoral and value-neutral. This has almost become a cliché. Yet, let us have a second look at it.

S&T has potential for good and evil. It is true that the blame for the evil uses must lie heavily upon the user rather than the scientist or technologist. A knife can be used for cutting vegetables or surgical removal of a dangerous cancer or for killing a man. No one in his proper sense will blame the maker of the knife when a murderer uses it as weapon!

Like all arguments, there is an element of fallacy here. You cannot compare a knife with an atomic bomb! Further, the Bomb has only destructive uses and any scientist collaborating in the manufacture of nuclear bombs must perforce know what he is doing and has to share the guilt rather than pretend to be a blue-eyed innocent!

Can we then do only that type of research that is benign and beneficial to mankind? This is indeed a tall order! For one thing, a discovery that looks innocuous now may be used later for some evil purpose!

However, let us remember that there were scientists such as the great Frenchman Louis Pasteur (1822-1895), who vowed to do only research which is beneficial to man. Pasteur made the anti-rabies vaccine, discovered pasteurization process for preserving milk, and so on. He was a humanitarian first and a scientist next. There are critics who opine that this obsessive compulsion on "good use"

restricted the reach and depth of his research; they say that if he did not have this self-imposed restriction, Pasteur would have been a much greater scientist! This is arguable! Anyway, Pasteur is now regarded as a great human being among scientists and a great scientist among human beings!

## Science and Ethics - definitions and interpretations

Science is generally defined as systematized knowledge, acquired by human effort, through methods of experimentation and rigorous reasoning. Science gives us an understanding of natural phenomena. Science is a search for truth. In science, fact comes before theory. Facts are nature's truths and they rarely change; they only become more complete and clarified. Theories are man's attempts to interpret facts and these get revised or altered or overthrown from time to time, as new facts are discovered.

But what do we mean by "Ethics"? Let me quote Bertrand Russell here[3]. He says: "*The study of ethics, traditionally, consists of two parts, one concerned with moral rules, the other with what is good on its own account……It has been supposed that God reveals to each human heart what is right and what is wrong, so that, in order to avoid sin, we have only to listen to the inner voice. There are, however, two difficulties in this theory: first, that conscience says different things to different people; secondly, that the study of the unconscious has given us an understanding of the mundane causes of conscientious feelings……It (Conscience) tells one man that he ought to defend his country in case of invasion, while it tells another that all participation in warfare is wicked".*

Russell goes on to say that he supports the doctrine of "subjectivity" of values. This essentially means that ethics are inherently subjective. What is good for one man (or one society!) need not be good for another man (or society).

Russell's conclusion is that, "while it is true that science cannot decide questions of values, that is because they cannot be intellectually decided at all, and lie outside the realm of truth and falsehood. Whatever knowledge is attainable, must be attained by scientific methods; and what science cannot discover, mankind cannot know". In short, Ethics lie outside the domain not only of Science, but also of Human Knowledge!

The above mentioned Russellian view is, of course, highly philosophical. Ethics represent certain rules of conduct, albeit vague, that would lead to the common good of humanity. It is naturally difficult to define this "common good". For example, as Russell himself poses the question, what is the ethically justified attitude—*to participate in a war to defend one's country, or to be a "pacifist" and abstain from any activity supporting any war?* It is interesting to note that Bertrand Russell was ostracized for being a pacifist during the World War and that Winston Churchill, who offered 'blood, sweat and tears' to the allies urging them on to fight for freedom, became a war hero of the British nation. Who was ethically correct? Russell or Churchill? We have an ethical dilemma here! Russell was right because he considered all wars immoral. Churchill was right, because his leadership enabled Britain to fight the Nazis and this action averted

possible Nazi victory and the possible end of democracy in the world.

## Ethical dilemmas in the context of Indian epics

It is only natural to expect mention of some great ethical dilemmas in our own ancient epics. The Mahabharata is in fact replete with them! Time and again, Lord Krishna had to re-interpret what was *dharma*. Yudhishtir, that paragon of honesty and truthfulness, had to lie once, when he whispered that Aswathama had died. (He declared: *Aswathama hata kunjara*, pronouncing the last word "kunjara" inaudibly, so that Drona, father of Aswathama, heard only the first part!) Krishna had to resort to tricks to protect Arjun against the attacks by Karna. In Ramayana, one may cite the killing of Bali (Vali) by Rama. It is not surprising that the ancient Indian seers had to proclaim that "*dharmasya tatthwam nihitam guhayam*".

Ethical dilemmas will have to be subjectively handled. Each scientist and each technologist will have to look deep into his own 'soul' and try to find the answer for himself. Thus, in the final analysis, we are reduced to saying, rather helplessly indeed: "So help us, God!

It is in the nature of science and technology that any invention or discovery can be used for good or for bad. Science is amoral and value-neutral. It is the user who decides whether a scientific or technological breakthrough is to be used for the welfare of mankind or for destructive purposes. The responsibility and guilt for the destructive use lies with the political leaders and administrators who wield the real power in the affairs of men and certainly not on the inventor technologist or the discoverer scientist.

### References

1. Internet—http://en.wikipedia.org/wiki/List_of_premature-obituaries

2. Internet-http://hypertextbook.com/eworld/einstein/shtml(E-World - Glenn Elert)

3. Bertrand Russell in "Religion and Science" (Oxford University Press, 1961)

People are often unreasonable, illogical and self centered – **Forgive them anyway**
If you are kind, people may accuse you of selfish, ulterior motives – **Be kind anyway**
If you are successful, you will win some false friends and some true enemies - **Succeed anyway**
If you are honest and frank, people may cheat you – **Be honest and frank anyway**

Mother Teresa